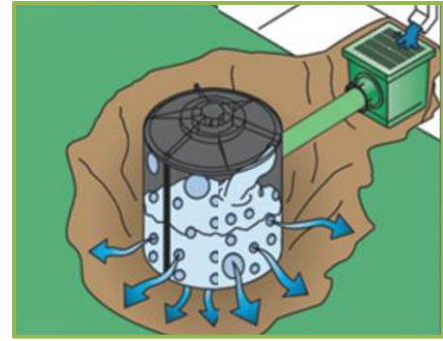


## DRY WELLS

Dry wells are seepage tanks set in the ground and surrounded with stone. They are designed to intercept and temporarily store stormwater runoff until it infiltrates into the soil. Alternatively, the pit can be filled with stone where water will flow in via a perforated standpipe in place of the tank.

Dry wells are well-suited to receive rooftop runoff entering the tank via an inlet grate (shown at right) or a direct downspout connection (below right). When properly sized and laid out, dry wells can provide significant reductions in stormwater runoff and pollutant loads. **If an infiltration rate measured in accordance with Appendix A is less than 0.25 in/hr, a dry well is not suitable for your site.**



Source: [www.earthcontactproducts.com](http://www.earthcontactproducts.com)

## LOCATION

- Dry wells must be located at least 10 feet from building foundations and 10 feet from property lines.
- To reduce the chance of clogging, dry wells should drain only impervious areas, and runoff should be pretreated with at least one of the leaf removal options to remove debris and larger particles.
- The height of the tank should not exceed 72 inches unless infiltration testing has been done to ensure a drain time of 72 hours or less.
- Dry wells should be located in a lawn or other pervious (unpaved) area and should be designed so that the top of the dry well is located as close to the surface as possible.
- NOTE: Dry wells should not be located: (1) beneath an impervious (paved) surface; (2) above an area with a water table or bedrock less than two feet below the trench bottom; (3) over other utility lines; or, (4) above a septic field. Always call Missouri One Call to locate utility lines before you dig.

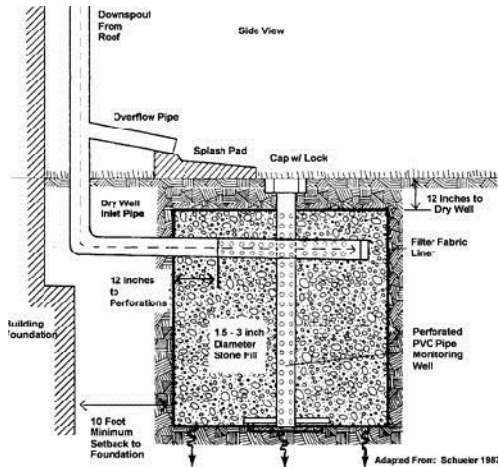


## CONSTRUCTION

- Consider the drainage area size and the soil infiltration rate when determining the size of the dry well, (see table on next page).
- The sides of the excavation should be trimmed of all large roots that will hamper the installation of the permeable drainage fabric used to line the sides and top of the dry well.
- The dry well hole should be excavated 1 foot deeper and two feet larger in diameter than the well to allow for a 12 inch stone fill jacket.
- The native soils along the bottom of the dry well should be scarified or tilled to a depth of 3 to 4 inches.
- Fill below and around dry well approximately 12 inches of clean, washed ASTM No. 57 stone. No.57 stone averages ½ inch to 1-½ inches.
- Fill the final 6 inches of the excavation with native soil, pea gravel, or ASTM No. 8 stone.
- For rooftop runoff, install a leaf screen in the gutter or downspout prior to entering the dry well to prevent leaves and other large debris from clogging the dry well. For non-rooftop runoff, precede the dry well with an in-ground sump grate or inlet leaf trap.
- An overflow, such as a vegetated filter area or grass channel, should be designed/provided to safely convey the stormwater runoff generated by larger storm events bypassing the dry well.
- The optional design involves placement of a vertical standpipe connected to the inlet pipe.

The table below can be used to size a dry well system. For a given tank height and diameter the contributing drainage area captured can be read. For example, if a 10 by 50 foot roof is to be treated, the total roof area is 10x50 = 500 square feet. This could be handled by one tank 30" high, 48" diameter. It can also be handled by two tanks 30" high, 30" in diameter.

Measure the site infiltration rate according to Appendix A, if it is less than 0.25 in/hr, a dry well is not suitable for your site. If it higher than 0.50 in/hr, the size of the dry well can be reduced. For every 0.5 in/hr increase in measured infiltration rate above 0.50 in/hr subtract ten percent of the required dry well size as measured in square feet captured.



Gravel Bed Depth (inches)	Tank Height (inches)	Tank Inside Diameter (inches)					
		30	36	42	48	60	72
		Contributing Area Captured (square feet)					
6	30	290	380	480	590	840	1150
12	30	320	420	520	640	920	1240
6	60	-	-	-	-	1570	2140
12	60	-	-	-	-	1640	2240

Hole Depth (inches)	6" Perforated Standpipe Gravel Filled Hole Diameter (inches)						
	24	30	36	42	48	60	72
		Contributing Area Captured (square feet)					
24	30	50	60	80	100	160	230
30	-	60	80	100	130	200	280
36	-	-	90	120	150	240	340
42	-	-	-	140	180	280	390
48	-	-	-	-	200	310	450
60	-	-	-	-	-	390	560

## VEGETATION

- The landscaped area above the surface of a dry well should be covered with pea gravel if water enters the dry well through surface features rather than a pipe. This pea gravel layer provides sediment removal and additional pretreatment upstream of the dry well and can be easily removed and replaced when it becomes clogged.
- Alternatively, a dry well may be covered with an engineered soil mix, and planted with managed turf or other herbaceous vegetation.

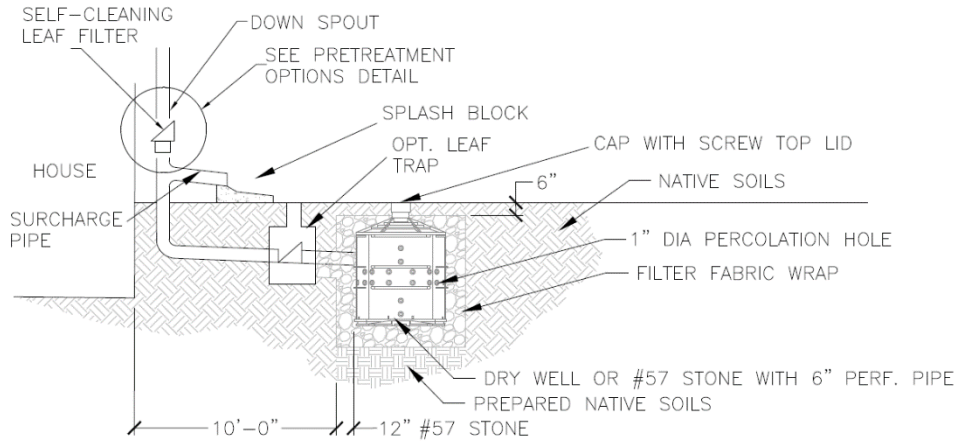
## MAINTENANCE

Annual maintenance is important for dry wells to ensure they continue to provide measurable stormwater management benefits over time.

- Inspect gutters and downspouts removing accumulated leaves and debris.
- Inspect dry well following rainfall events.
- If applicable, inspect pretreatment devices for sediment accumulation. Remove accumulated trash and debris.
- Inspect top layer of filter fabric for sediment accumulation. Remove and replace if clogged.



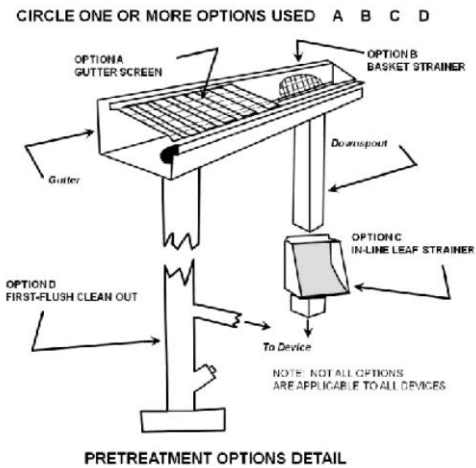
### DRY WELLS



TYPICAL COMPONENTS (ATTACH MANUFACTURER'S SPECIFICATIONS)

**CONSTRUCTION STEPS:**

1. Review potential dry well areas and layout. Dry wells shall not be located: (1) beneath an impervious (paved) surface; (2) above an area with a water table or bedrock less than two feet below the trench bottom; (3) over other utility lines; or, (4) above a septic field. Ensure outlet daylight or is discharge through a popup emitter at least ten feet from property line.
2. Measure the area draining to the dry well and determine required size from the table on the next page.
3. Perform an infiltration test according to Appendix A. If the rate is less than 0.25 in/hr this method cannot be used. If the rate is more than 0.50 in/hr the storage volume may be decreased 10% for every 0.50 in/hr of infiltration rate increase above 0.50 in/hr.
4. Measure elevations and dig the hole to the required dimensions. Scarify the bottom soil surface 3-4 inches.
5. Place and tamp 6" to 12" of #57 gravel in bottom. Pea gravel can be substituted for leveling purposes in the upper three inch layer below the tank.
6. Place and secure filter cloth down sides of the excavation leaving enough to fold over the top below the soil and turf.
7. Place tank and install piping. Bond top of tank in place.
8. Cut and route downspouts or other rainwater delivery components; install chosen leaf screen option(s) (circle selected options in Pretreatment Options Detail figure). Strap and support as needed.
9. Create a safe overflow at least 10 feet from your property line and ensure it is protected from erosion.
10. Test connections with water flow.
11. Fill with gravel jacket around tank and place permeable fabric above between gravel and soil.
12. Backfill with soil/sod or pea gravel.
13. Consider aesthetics as appropriate and erosion control for overflow.



CITY OF KIRKWOOD	NAME/ADDRESS:	DRY WELL SPECIFICATIONS PAGE 1 OF 2
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**DRY WELL – LAYOUT SKETCH**

PROVIDE PLAN AND ELEVATION VIEWS OF DRY WELL AND HOUSE SHOWING ROOF AREA DIRECTED TO DRY WELL AND KEY DIMENSIONS, CONNECTIONS AND OVERFLOW RELATIVE TO PROPERTY LINE.

**SIZING CALCULATION:**

SITE INFILTRATION RATE= \_\_\_\_\_ IN/HR

- IS BMP SUITABLE FOR SITE? YES NO
- CAN BMP SIZE BE REDUCED? YES NO

Gravel Bed Depth (inches)	Tank Height (inches)	Tank Inside Diameter (inches)					
		30	36	42	48	60	72
Contributing Area Captured (square feet)							
6	30	290	380	480	590	840	1150
12	30	320	420	520	640	920	1240
6	60	-	-	-	-	1570	2140
12	60	-	-	-	-	1640	2240

Hole Depth (inches)	6" Perforated Standpipe Gravel Filled Hole Diameter (inches)						
	24	30	36	42	48	60	72
Contributing Area Captured (square feet)							
24	30	50	60	80	100	160	230
30	-	60	80	100	130	200	280
36	-	-	90	120	150	240	340
42	-	-	-	140	180	280	390
48	-	-	-	-	200	310	450
60	-	-	-	-	-	390	560

MEASURE CONTRIBUTING DRAINAGE AREA AND READ AREA FOR GIVEN MEDIA DEPTH.

CONTRIBUTING DRAINAGE AREA= \_\_\_\_\_ SQ FT

TANK DIAMETER/WIDTH= \_\_\_\_\_ INCHES

TANK HEIGHT= \_\_\_\_\_ INCHES

GRAVEL BED DEPTH= \_\_\_\_\_ (6 OR 12 INCHES)

ALTERNATIVE STANDPIPE DESIGN

HOLE DIAMETER= \_\_\_\_\_ INCHES

HOLE DEPTH= \_\_\_\_\_ INCHES

**MAINTENANCE:**

1. INSPECT GUTTERS AND DOWNSPOUTS REMOVING ACCUMULATED LEAVES AND DEBRIS, CLEANING LEAF REMOVAL SYSTEM(S).
2. IF APPLICABLE, INSPECT PRETREATMENT DEVICES FOR SEDIMENT ACCUMULATION. REMOVE ACCUMULATED TRASH AND DEBRIS.
3. INSPECT DRY WELL FOLLOWING A LARGE RAINFALL EVENT TO ENSURE OVERFLOW IS OPERATING AND FLOW IS NOT CAUSING PROBLEMS.

CITY OF KIRKWOOD

ATTACH THIS TWO-PAGE SPECIFICATION TO HOUSE PLAN SUBMITTAL

DRY WELL SPECIFICATIONS PAGE 2 OF 2